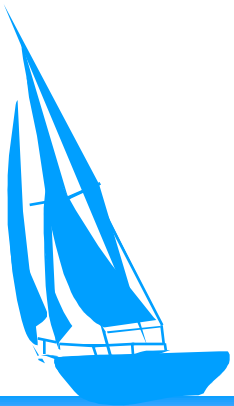




R&D in the Restructured Electricity Industry

Vice Chair David A. Rohy, Ph.D.
California Energy Commission

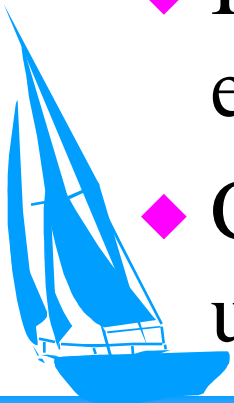
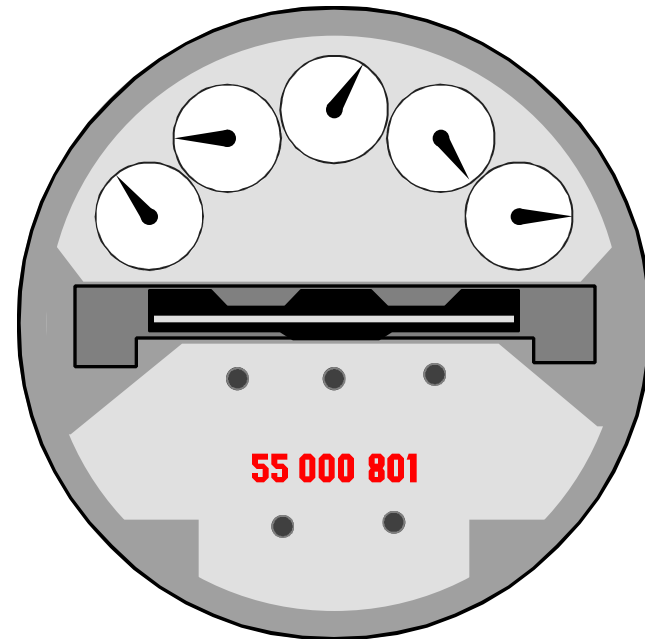


November 2, 1998



Why Change the System?

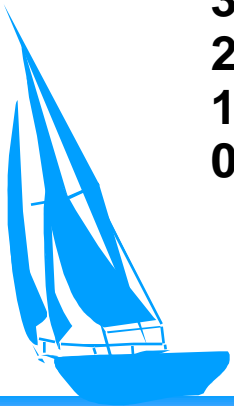
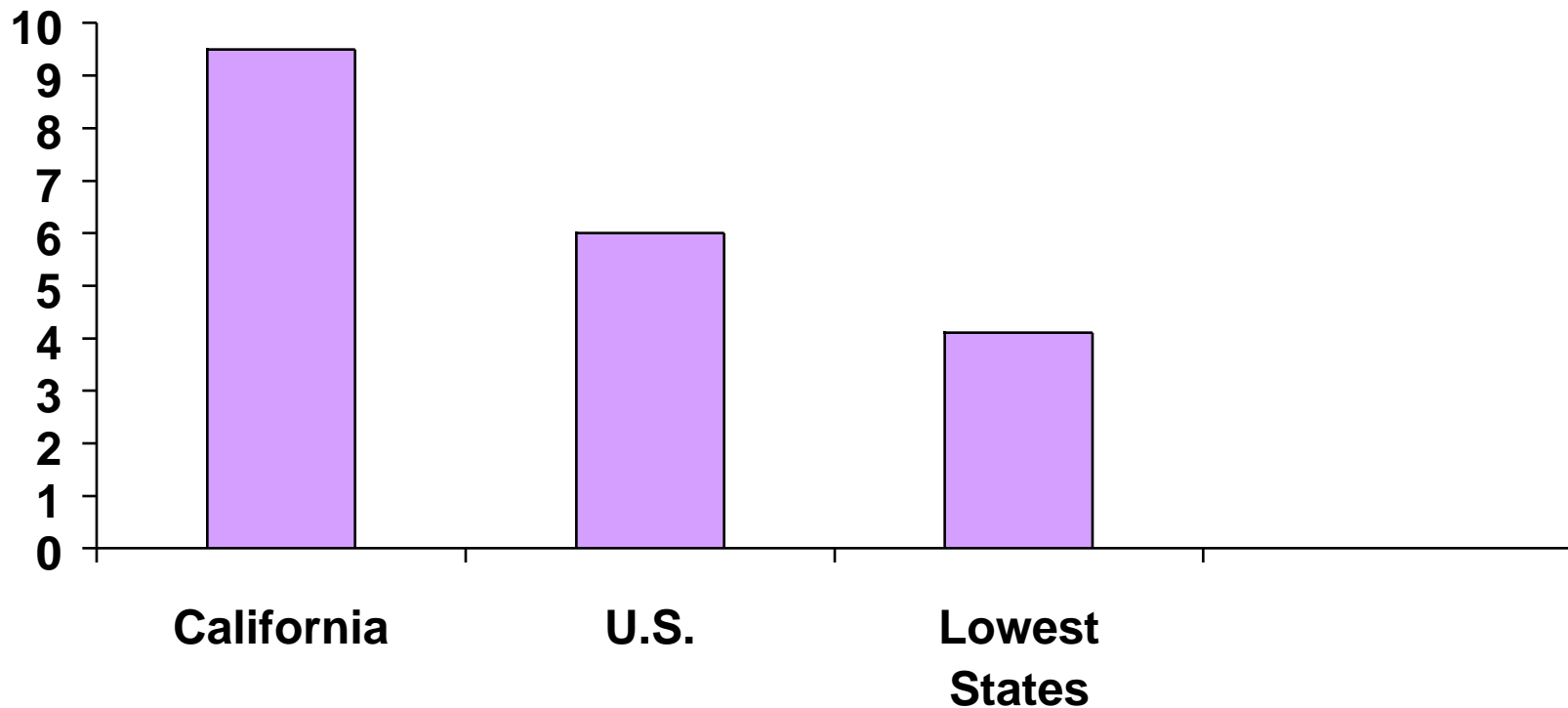
- ◆ High electricity rates in California
- ◆ Demand for different qualities
- ◆ Incentive for efficiency
- ◆ Creative unbundling





Electric Rates in California Compared to the U.S.

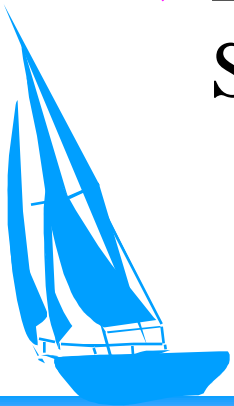
(cents per kWh)





Restructuring Legislation

- ◆ Independent System Operator
- ◆ Power Exchange
- ◆ Public Purpose Goals
- ◆ Recovery of Stranded Costs





ISO Functions

- ◆ Electricity dispatch
- ◆ Open access
- ◆ Open communication
- ◆ Ancillary services
- ◆ System reliability





Power Exchange Functions

- ◆ Buy/sell pool
- ◆ Mechanism for market to “clear”
- ◆ Reveals market clearing prices
- ◆ Locational price differentials

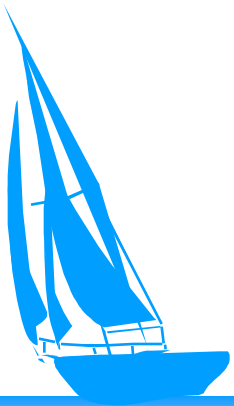
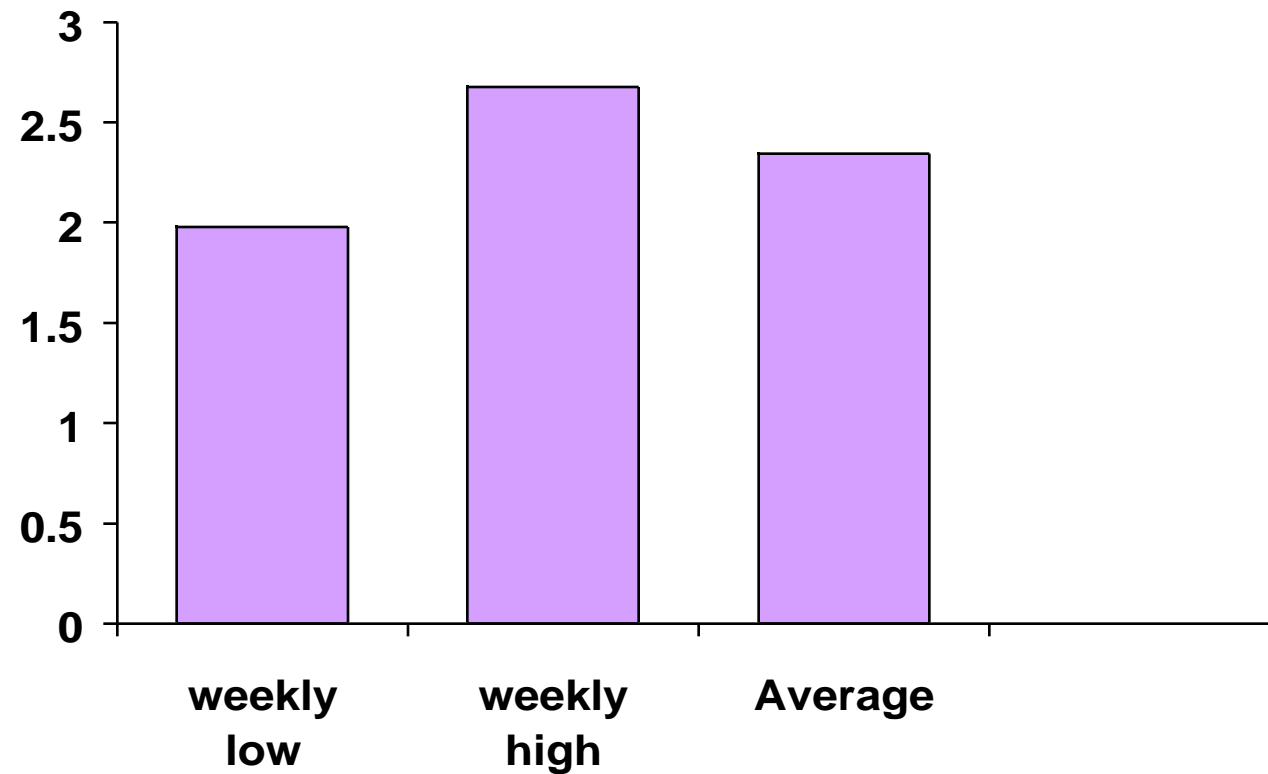




Power Exchange Prices

Week Ending Sept. 25, 1998

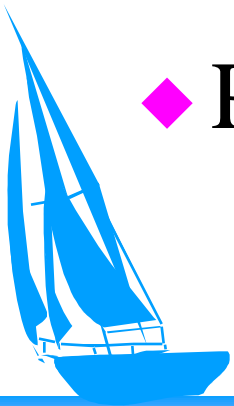
(cents per kWh)





Recover Stranded Costs

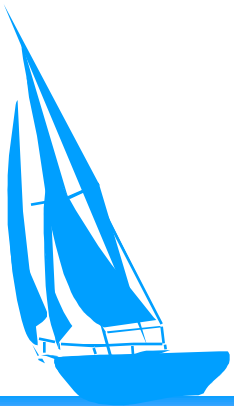
- ◆ Estimated total: \$28-30 billion
- ◆ Competition Transition Charge (CTC)
- ◆ Non-bypassable charge
- ◆ Price effect: 4 cents/kWh





What Changes in R&D?

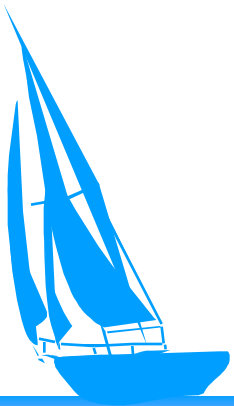
- ◆ Funding from electricity surcharge
- ◆ Run by CEC, not utilities
- ◆ Five subject areas
 - End-Use Efficiency
 - Advanced Generation
 - Renewables
 - Environmental
 - Strategic





Stage One

- ◆ Transition Funding
- ◆ First General Solicitation
- ◆ Second General Solicitation





What Are We Looking For?

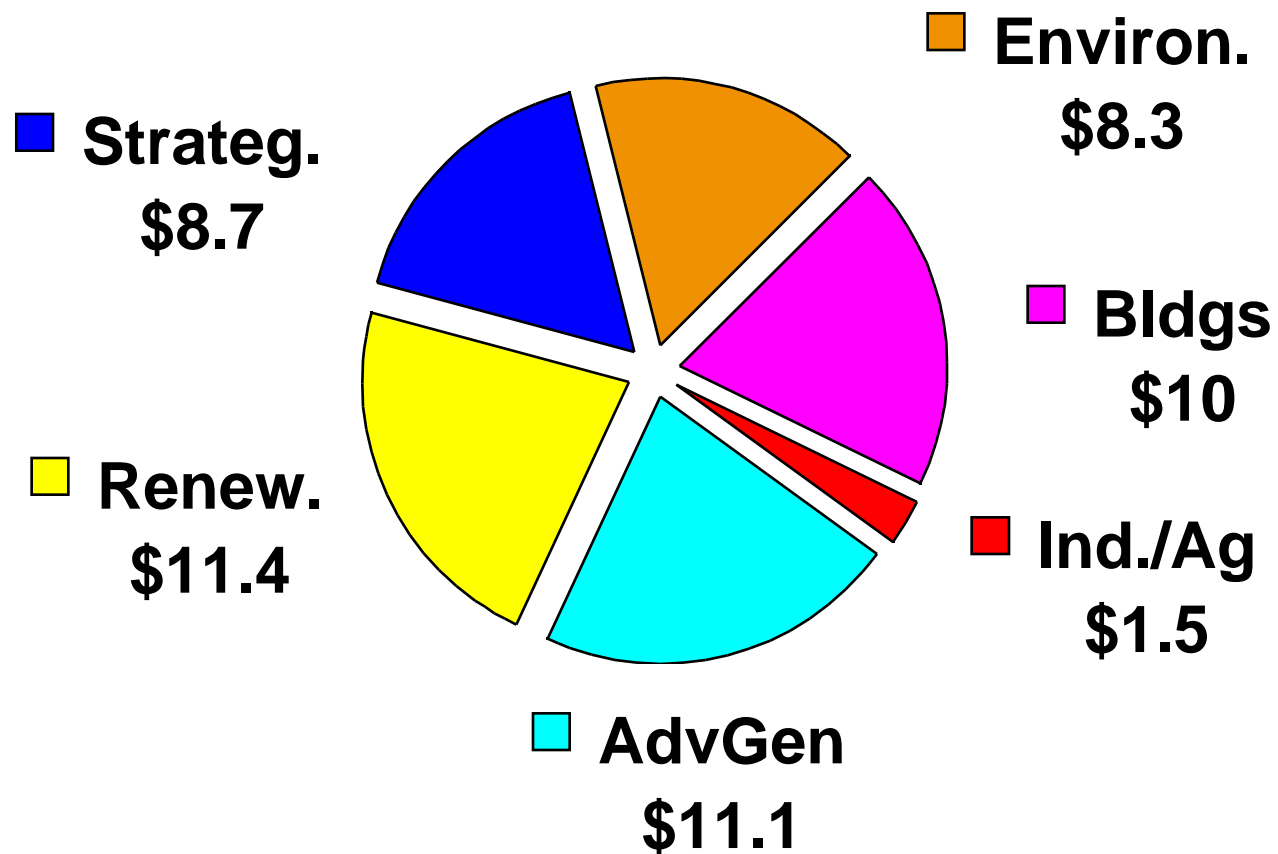
Benefits to California Ratepayers

- ◆ Cost and value
- ◆ Environment
- ◆ Reliability
- ◆ Electrical Safety
- ◆ Market connection
- ◆ Economy



Funded PIER Projects, by Area

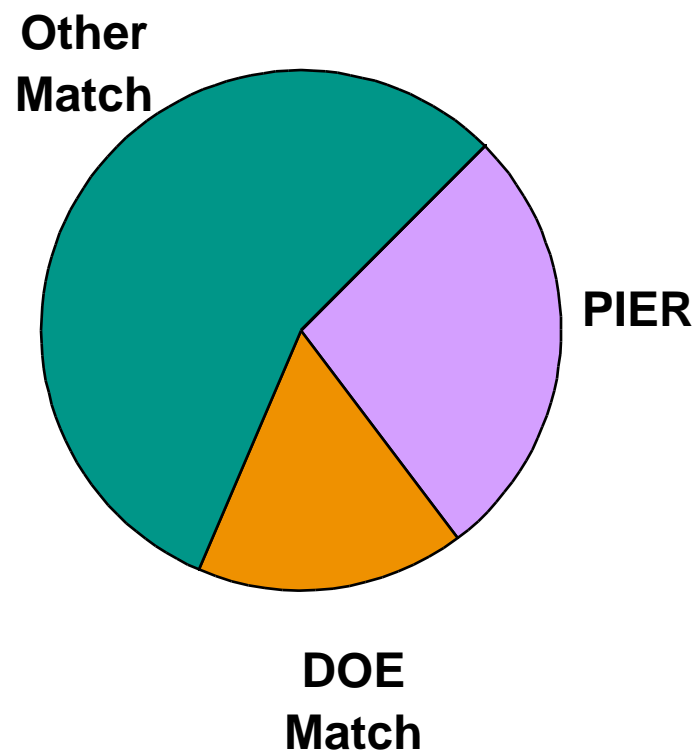
(in millions of dollars)



Match Funding

(First General Solicitation)

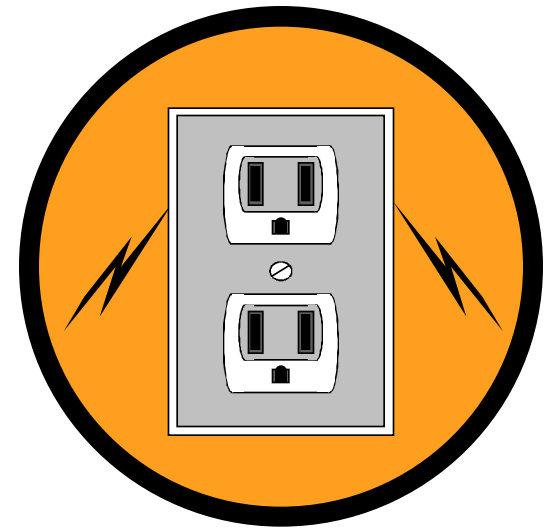
- ◆ Project Cost
\$66 million
- ◆ PIER Funding
\$18 million
- ◆ Match Funding
\$48 million
(\$11 million from DOE)





Issues for Advanced Generation

- ◆ Significantly improved efficiency
- ◆ Alternatives to replace older plants
- ◆ Pollution control technologies for future emission limits
- ◆ Technology for use in distributed generation

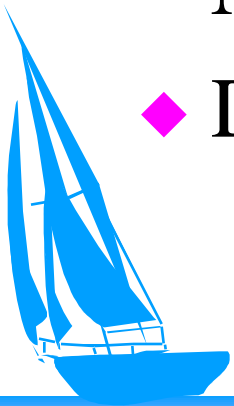




Advanced Generation Projects

(Examples from 3 solicitations, totaling \$11.1 million)

- ◆ MW-class Pressurized Solid-Oxide/ Fuel Cell/Gas Turbine
- ◆ Low NO_x Gas Turbine Combustors
- ◆ Ultra High-Efficiency Packaged Microcogeneration
- ◆ Durability of Catalytic Combustor Systems



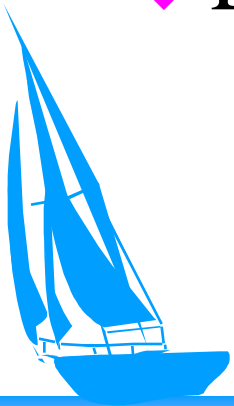


Example of Project Goals

Alzeta Corp. -- Low NO_x Combustor

- ◆ NO_x
 - 2 ppm on gaseous fuels
 - 5.5 ppm on liquid fuels

- ◆ Low cost emission reduction
 - Lower cost by \$100/kW for smaller facilities





Sources of Electricity for California

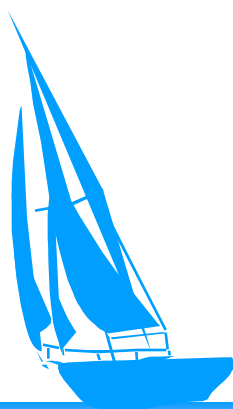
POWER CONTENT LABEL

ENERGY RESOURCES	PRODUCT A* (projected)	1997 CA POWER MIX** (for comparison)
Eligible Renewable	55%	11%
-Biomass & waste	-	2%
-Geothermal	-	5%
-Small hydroelectric	-	2%
-Solar	-	<1%
-Wind	-	1%
Coal	10%	21%
Large Hydroelectric	12%	23%
Natural Gas	15%	30%
Nuclear	8%	15%
Other	<1%	<1%
TOTAL	100%	100%

* 50% of **Product A** is specifically purchased from individual suppliers.

**Percentages are estimated annually by the California Energy Commission based on the electricity sold to California consumers during the previous year.

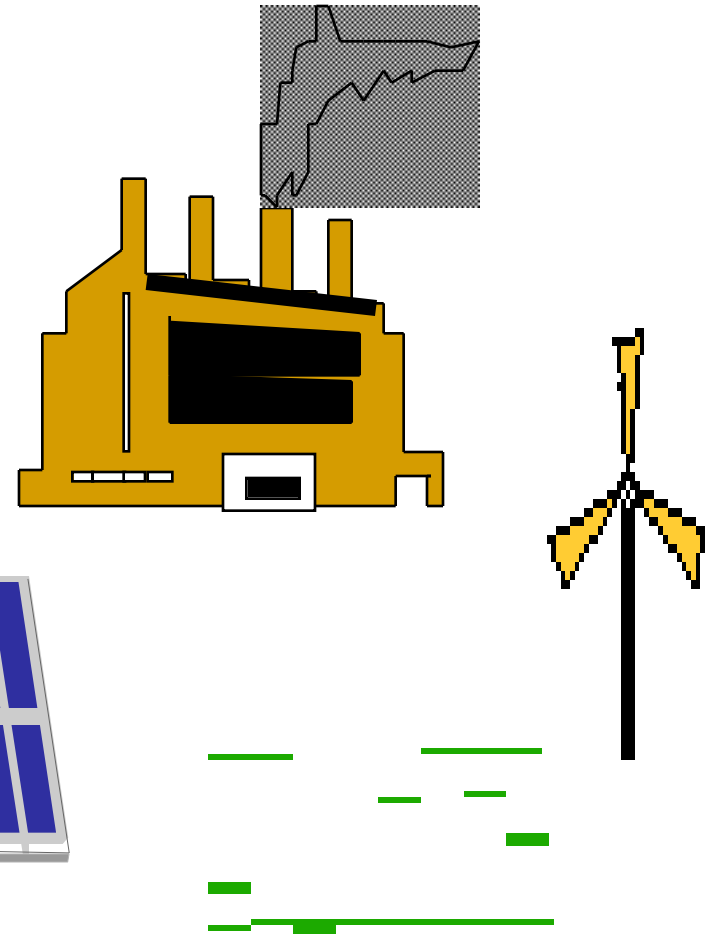
For specific information about this electricity product, contact **Company Name**. For general information about the Power Content Label, contact the California Energy Commission at 1-800-555-7794 or www.energy.ca.gov/consumer





Current California Powerplants

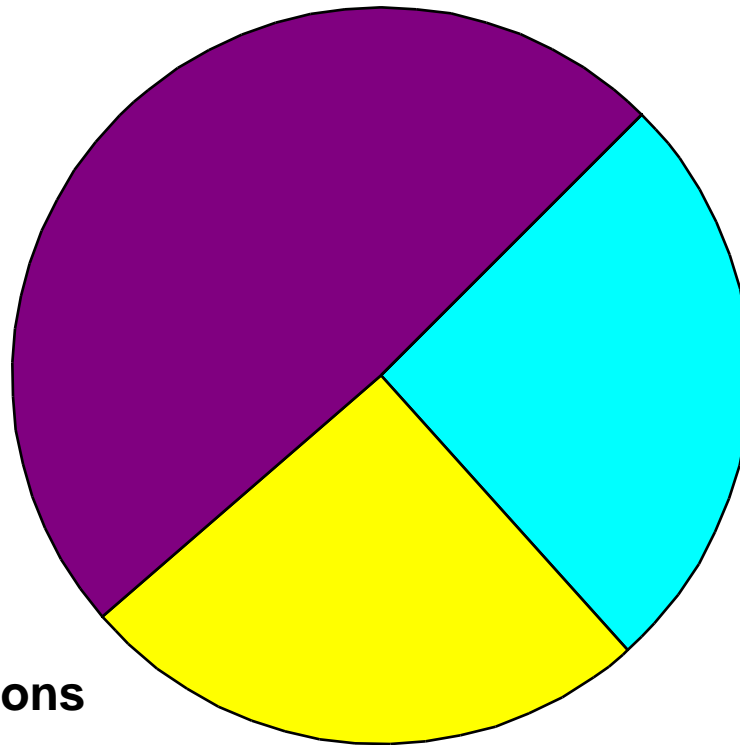
- ◆ 1,900 powerplants
- ◆ 52,000 MW capacity
- ◆ 77% private
- ◆ 23% public





Planned New Power Plants in California (Adds 10,590 MW)

**12 Prefilings
5,190 MW**



**4 Applications
for Certification
2,750 MW**

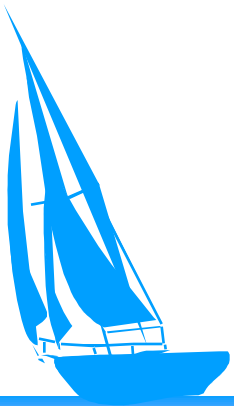
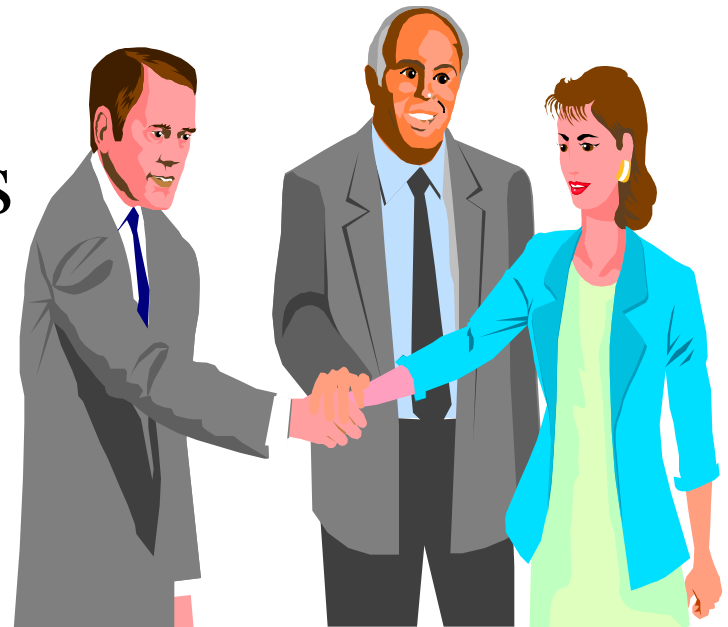


**4 NOI Exemptions
2,650 MW**



Market Connection

- ◆ Collaborate with manufacturers
- ◆ Assess market need
- ◆ Reduce market barriers
- ◆ Transfer results to marketplace





Program Evaluation: Determining the Results

- ◆ Review by independent experts
- ◆ Measure public benefits
- ◆ Quarterly, annual reports to Legislature

